BUILDING & APARTMENT MAINTENANCE

Program of Studies
2014-2015

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Building and Apartment Maintenance

Course Title	Post-Secondary Connection	Valid Course Code	Recommended Grade Level							Recommended Credit
						9	10	11	12	
Basic Blocklaying	MASE 104	460110						X	X	.5
Basic Bricklaying	MASE 103	460109						X	X	.5
Basic Troubleshooting	BTX 205	470317						X	X	.5
Blueprint Reading	BRX 120	470302					X	X	X	.5
Co-Op 1	CAR 199	460180							X	.5
Digital Literacy	DLC 100	060112				X	X			.5
Industrial Safety	ISX 100	460301					X	X	X	.5
Internship	CAR 298	460183							X	.5
Intro to Building & Apartment Maintenance	BAM 100	460241					X	X		.5
Introduction To Masonry	MASE 105	460112					X	X		.5
Personal Financial Management	BAS 120	060170				X	X			.5
Refrigeration Fundamentals	ACR 100	470219				X	X	X		.5
Refrigeration Fundamentals Lab	ACR 101	470220				X	X	X		.5
Residential Carpentry Maint.	BAM 110	460220						X	X	.5
Residential Carpentry Maint. Lab.	BAM 115	460221						X	X	.5
Residential HVAC Maint.	BAM 150	460818						X	X	.5
Residential HVAC Maint. Lab	BAM 155	460819						X	X	.5
Residential Interior Maint.	BAM 120	460222						X	X	.5
Residential Interior Maint. Lab	BAM 125	460223						X	X	.5
Residential Masonry Maint.	BAM 170	460114						X	X	.5
Residential Masonry Maint. Lab	BAM 175	460115						X	X	.5
Residential Plumbing Maint.	BAM 130	460516						X	X	.5
Residential Plumbing Maint. Lab	BAM 135	460517						X	X	.5
Residential Wiring Maint.	BAM 140	460333						X	X	.5
Residential Wiring Maint. Lab	BAM 145	460335						X	X	.5
Workplace Principles	WPP 200	060191				X	X	X		.5

CONSTRUCTION TECHNOLOGY

BUILDING & APARTMENT MAINTENANCE

Program Description: (Overview)

The Construction Technology programs will prepare students for work in new construction, remodel, and energy auditing industries. Course offerings include everything from entry level trades courses, all the way to national certification. Students will train at the career centers, high schools and at real jobsites. Current and traditional building practices are included, while updated and advanced framing techniques, energy efficiency, health and safety, and sustainability methods are emphasized.

Construction Pre-Apprenticeship courses are included that focus on new construction, carpentry, and other building trades. Students learn about the tools and techniques used in the construction industries. The students may gain skills in Air Conditioning Technology, Building and Apartment Maintenance, Carpentry, Electrical Technology, Masonry and Plumbing. They are also introduced to green building methods and materials. The Building Performance and Energy Assessment courses shift that focus to analyzing existing homes.

Weatherization, Building Performance and Energy Assessment industries are helping families reduce their energy burden, while maintaining comfort and safety. Our students will learn the national standard and protocols for energy auditing, combustion appliance safety, and energy modeling. Successful students are prepared to take the national certification exams for building analysts and energy auditors.

Course offerings are intended to promote career ladders for those just entering the industry, as well as industry professionals looking to stay current. There are multiple certificates and degree options and inter-related disciplines at the Career Centers having articulation agreements with various post secondary institutions.

KDE Career Pathways Building & Apartment Maintenance 2014-2015		
Career Pathway	**Pathway Courses**	**Elective Courses**
Residential Maintenance Carpenter Helper **CIP 46.0401.00** ***Tests for Certification:*** • **KOSSA – Construction Test** • **NCCER – Core Curriculum**	• **Intro to Building & Apartment Maintenance 460241** • **Residential Maintenance Carpentry/Lab460220/221** • **Digital Literacy 060112** • **Workplace Principles 060191**	• **Personal financial Management 060170** • **Basic Blueprint Reading 407302** • **Residential HVAC Maintenance/Lab 460818** • **Residential Interior Maintenance/Lab 460222** • **Residential Wiring Maintenance 460333** • **Digital Literacy 060112**
Bricklayer Helper **CIP 46.0101.01** ***Tests for Certification:*** • **KOSSA – Construction** • **NCCER – Core Curriculum** • **NCCER – Masonry Level 1**	• **Industrial Safety 460301** • **Intermediate Masonry 460116** • **Intro to Masonry 460112** • **Residential Masonry Maintenance 460223**	• **Workplace Principles 060191** • **Personal Financial Management 060170** • **CO-OPI 460180** • **Internship - 460183** • **Basic Blocklaying 460110** • **Basic Bricklaying 460109**

Environmental Control System Helper **CIP Code: 47.0201.02** ***Tests for Certification*** • **KOSSA – Construction Test** • **NCCER – Core Curriculum** • **NCCER – HVAC Level 1**	• **Refrigeration Fundamentals/Lab 470219/220** • **HVAC Electricity/Lab460817816** • **Electrical Components/Lab470215/216** • **Heat Pump Applications/Lab460801/802**	• **Sheet Metal Fabrication/Lab 460847** • **Residential Energy Auditor 460804** • **Heating & Humidification/Lab 460820** • **Cooling & Dehumidification/ Lab 470213** • **Residential Plumbing Maintenance 460516** • **Basic Troubleshooting 470317** • **Residential HVAC Maintenance 460818/819**

SAMPLE CAREER PATHWAY/BUILDING & APARTMENT MAINTENANCE

Kentucky Career Pathways/ Program of Studies for Butler County ATC

COLLEGE/UNIVERSITY: Owensboro Technical College or WKU
HIGH SCHOOL (S): Butler County High School
CLUSTER: Construction
PATHWAY: Construction
PROGRAM: Carpentry Construction Technology

	GRADE	ENGLISH	MATH	SCIENCE	SOCIAL STUDIES	RECOMMENDED ELECTIVE COURSES OTHER ELECTIVE COURSES CAREER AND TECHNICAL EDUCATION COURSES			CREDENTIAL CERTIFICATE DIPLOMA DEGREE	SAMPLE OCCUPATIONS
SECONDARY	9	English 9	Algebra I	Earth Science	Government	Health/PE	Elective	Computer Applicatio	Roofer47-2181.00-01	
	10	English 10	Geometry	Biology 1				CAR126/127	**Foundations 47-3012.00-05	ISX100 Industrial Safety
	11	English 11	Algebra II	Physics	U.S. History	Art Apprec	BRX 120 / ISX100	CAR196/197	***Framing 47-3012.00-04	Construction Roof Installer
	12	English 12	Math elective		Elective	Elective	CAR 190/191	CAR 199 Co-op	*Floor & Wall 47-3012.00-03	Construction Carpenter
		BRX120-Basic Blueprint Reading,CAR126/127-Intro to Carpentry, CAR190/191-Floor & Wall, ISX 100 Industr Safety								
		CAR 196/197-Ceiling & Roof CAR 199-Co-op								
		Take ACT or Compass for admission	Owensboro Community and Technical College or WKU						*Onet	
POSTSECONDARY		Owensboro Tech College, other KCTCS campus, or WKU							Certificates	
	Year 13	A -CATS	Math	Science	Computer Applications	CAR 150/151 Construction Forms	BRX 220 Construction Prints	CAR 140/141 Site Layout		Trim & Finish Carpenter
	Year 14	Communications	Math	Humanities	Social Interaction	CAR 200/201 Exterior & Interior Fin.	CAR 198 Practicum	Eelctive	Degree Carpenter Diploma	Contractor
		Apply for admission at WKU and meet all admission requirements								
	Year 15	Humanities	Psychology	Economics	PSY 310	EXED 330	SEC 300	SEC 364		
	Year 16	Math	Science	SEC 365	SEC 366	SEC370	SEC 463	599 Industrial Education	Bachelor's Degree	Carpentry Instructor
		43 hours in related technical courses, 33 hours in 300 or above								

League for Innovation in the Community College
CCTI College and Career Transitions Initiative
Funded by the U. S. Department of Education
51B020001)
sed Jan. 2005
06-CTE/Kentucky

Required Courses
Recommended Elective Courses
Other Elective Courses
Career and Technical Education Courses
Credit-Based Transition Programs (e.g. Dual/Concurrent Enrollment, Articulated Courses, 2+2+2)
(◆=High School to Comm. College) (● =Com. College to 4-Yr Institution) (■ = Opportunity to test out)
Mandatory Assessments, Advising, and Additional Preparation

	Workplace Principles **060191**	
Course Description		
Workplace Principles examine the changing workforce and the skills needed to adapt to constantly changing demands and expectations. The course includes, but is not limited to, problem solving, teamwork, time management, and self-management skills. Job-seeking and job-retention skills are taught through the development of resumes and job search materials. Maximum benefit is received if this course is taken in the latter part of the student's course work.		
Content/Process		
1	**Describe and apply the problem-solving processes independently and in groups**	
2	**Describe the importance of teamwork and apply teamwork skills**	
3	**Identify barriers to full team participation (sexual harrassment, diversity, Americans with Disabilities Act, inhibiting behaviors)**	
4	**Apply conflict resolution skills in team situations (i.e., workplace violence)**	
5	**Describe the importance of time and self-management in the workplace**	
6	**Describe personal performance skills (i.e., appropriate dress, business protocol, personality traits, customer relations skills, and professional behavior)**	
7	**Describe the steps to take advantage of transition opportunities (i.e., lifestyle change, employment change)**	
8	**Develop an employment portfolio including a cover letter, resume, and reference page**	
9	**Identify sources for job leads and employer contacts**	
10	**Complete application forms**	
11	**Prepare and practice for job interviews**	
12	**Practice job follow-up strategies (job acceptance and job rejection)**	
13	**Review pre-employment tests**	
14	**Identify policies and procedures for a drug-free workplace, workers' compensation, Family Medical Leave Act, grievance policy, unemployment compensation, and business ethics**	
15	**Identify ergonomics and understand why ergonomics is important from a health point of view.**	
16	**Demonstrate accountability of and the safe and responsible use of company resources, office equipment, machines, etc.**	

17	**Apply Internet etiquette and safety**	
18	**Identify safety rules applicable to this course and demonstrate appropriate observance of said rules, including but not limited to, trip hazards, electrical cords and outlets, evacuation procedures for emergency situations (including fire, tornado, bomb threat, earthquake, etc.), lockdown procedures for emergency situations, location and contents of first aid kit, MSDS sheets, etc.**	

Connections

- **Secretary's Commission on Achieving Necessary Skills (SCANS)**
- **National Center for Construction Education Research (NCCER)**
- **21st Century Skills**
- **Common Core State Standards ELA and Math**
- **Interdisciplinary Course**

	Personal Finance **060170**	
Course Description		
Information needed to make intelligent choices and take effective action in the management of personal resources is provided. Topics include financial planning, buying, borrowing, saving, budgeting, investing, insurance, and taxes to personal finances.		
Content/Process		
1	**Compare major economic systems in the global economy**	
2	**Identify sources of consumer information, protection, rights, and responsibilities**	
3	**Describe the characteristics and services of financial institutions**	
4	**Deomonstrate the use of personal financial statements, budgets, and other financial tools to evaluate financial health.**	
5	**Identify options available for managing cash and liquid assets**	
6	**Identify investment opportunities**	
7	**Compare and evaluate consumer credit**	
8	**Develop strategies for making smart buying decisions with regard to housing, transportation, and consumer goods**	
9	**Identify major types of employee benefits**	
10	**Complete various types of tax forms**	
11	**Explain basic tax concepts and effective tax minimization strategies**	
12	**Identify and compare basic types of health, life, auto and homeowner/renter insurance**	
13	**Explain the basic financial markets and investment options**	
14	**Explain and discuss contingency planning, including retirement and estate planning**	
15	**Compute various financial transactions, such as account reconciliation, interest, captial gains, etc.**	
16	**Identify ergonomics and understand why ergonomics is important from a health point of view**	
17	**Demonstrate accountability of and the safe and responsible use of company resources, office equipment, machines, etc.**	

18	**Apply Internet etiquette and safety**	
19	**Identify safety rules applicable to this course and demonstrate appropriate observance of said rules, including but not limited to, trip hazards, electrical cords and outlets, evacuation procedures for emergency situations (including fire, tornado, bomb threat, earthquake, etc.), lockdown procedures for emergency situations, location and contents of first aid kit, MSDS sheets, etc.**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
***Post-Secondary: KCTCS ACR280**
CTSO's – Skills USA

	Industrial Safety **460301**	

Course Description

This course provides practical training in industrial safety. The students are taught to observe general safety rules and regulations, to apply work site and shop safety rules, and to apply OSHA regulations. Students are expected to obtain certification in first aid and cardiopulmonary resuscitation.

Content/Process

1	**Apply work site and lab safety procedures**	
2	**Apply personal safety rules and procedures**	
3	**Apply fire prevention rules and procedures**	
4	**Obtain first aid certification**	
5	**Obtain CPR certification**	
6	**Demonstrate hazardous communications procedures**	
7	**Describe and demonstrate universal precautions procedures**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
***Post-Secondary: KCTCS ACR280**
CTSO's – Skills USA

	Basic Blueprint Reading **470302**
	Course Description: **This course presents basic applied math, lines, multiview drawings, symbols, various schematics and diagrams, dimensioning techniques, sectional views, auxiliary views, threads and fasteners, and sketching typical to all shop drawings. Safety will be emphasized as an integral part of the course.**
	Content/Process
1	**Introduction and math review (fractions and decimals)**
2	**Identify the alphabet of lines**
3	**Identify multiple views**
4	**Arrange multiple views**
5	**Arrange two-view drawings**
6	**Identify one-view drawings**
7	**Arrange and identify auxiliary views**
8	**Demonstrate the use of size and location dimensions**
9	**Demonstrate proper dimensions of cylinders and arcs**
10	**Size dimensions of holes and angles**
11	**Locate dimensions for centering of holes, points, and centers**
12	**Interpret the base line dimensions on drawings**
13	**Identify half, full, and removed sections**
14	**Identify electrical schematic and diagram symbols**
15	**Identify welding symbols and equipment**
16	**Interpret ordinate and tabular dimensions**
17	**Set tolerances using geometric dimensioning techniques**
18	**Sketch parts with irregular shapes**
19	**Sketch oblique views of various parts**
20	**Sketch and dimension shop drawings**
21	**Dimension parts using shop notes**
22	**Calculate tolerances**
23	**Identify labeling of various screw threads**
24	**Calculate tapers and machined surfaces**

25	Interpret connections and flow of various electrical, hydraulic, and pneumatic schematics and diagrams

Connections:
***Common Core State Standards**
***KOSSA**
***New Generation Science Standards**
***Post-Secondary: KCTCS ACR280**
CTSO's – Skills USA

	Residential Interior Maintenance **Class 460222** **Lab 460223**	
Course Description		
This course covers the basic aspects of drywall hanging, finishing, and repair; painting; window, door, and floor moldings; laying composition and vinyl flooring; and maintaining ceramic tile.		
Content/Process		
1	Safely perform drywall practices	
2	Use drywall hammers, knives, saws, and sanders	
3	Measure, cut, and hang drywall	
4	Repair/replace cornerbead	
5	Mix and prepare joint compound	
6	Finish drywall joints	
7	Mix texturing compound	
8	Apply texture to ceilings	
9	Repair/replace damaged drywall	
10	Clean and maintain drywall tools	
11	Estimate drywall materials	
12	Practice painting safety	
13	Select and use a variety of paints	
14	Prepare an area for painting	
15	Prepare surfaces for painting	
16	Caulk cracks and moldings	
17	Cut-in corners and trim with brushes	

18	**Apply coatings with rollers and brushes**	
19	**Clean and maintain painting tools**	
20	**Estimate materials for painting**	
21	**Repair damaged wallpaper**	
22	**Use floor covering tools**	
23	**Install underlayment**	
24	**Repair/replace composition floor tiles**	

25	**Repair/replace vinyl flooring**	
26	**Estimate materials for floor coverings**	
27	**Regrout and caulk ceramic tiles**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
***Post-Secondary: KCTCS ACR280**
CTSO's – Skills USA

	Residential Maintenance Carpentry **Class 460220** **Lab 460221**	
Course Description		
This course covers the basic aspects of framing, roofing, window, door, and stair maintenance. The student will receive training in the proper use of ladders and in the handling and storage of building materials.		
Content/Process		
1	**Demonstrate safe carpentry practices**	
2	**Construct and/or install a partition wall**	
3	**Frame wall openings**	
4	**Install/repair roof flashing**	
5	**Install rolled roofing**	
6	**Install/replace composition shingles**	
7	**Weatherproof exterior siding**	
8	**Install/repair doors**	
9	**Install/repair door hardware**	
10	**Install/repair windows**	
11	**Construct concrete forms**	
12	**Install insulation**	
13	**Maintain gutters and downspouts**	
14	**Reglaze a window sash**	
15	**Install/repair a window screen**	
16	**Knowledge of building and trade codes**	
17	**Safely and properly handle and store materials**	
18	**Calculate material costs**	
19	**Knowledge of ordering and reviewing materials**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

RESIDENTIAL PLUMBING MAINTENANCE

Class 460516
Lab 460517

Course Description

This course covers the basic aspects of clearing blocked drains, repairing leaks, repair and replacement of residential plumbing fixtures, and working with copper, plastic, and steel pipes.

Content/Process

1	Practice safe plumbing procedures	
2	Identify plumbing systems components	
3	Use plumber's cutting, cleaning, and joining tools	
4	Remove obstructions from building drains	
5	Repair malfunctioning valves and faucets	
6	Measure, cut, ream, and join copper pipe	
7	Cut and join plastic pipe	
8	Bend copper pipe using spring benders	
9	Join steel pipe	
10	Join pipes of different types	
11	Secure pipes	
12	Repair/replace the water supply line for a plumbing fixture	
13	Repair leaks in pipes	
14	Insulate water pipes	
15	Repair/replace water closets	
16	Repair/replace lavatories	
17	Repair/replace kitchen sinks	
18	Test gas piping for leaks	
19	Maintain plumbing tools	
20	Estimate plumbing materials and supplies	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

	Basic Blocklaying **460110**	

Course Description

Demonstrate the proper and safe use of masonry tools and the various types of mortar and cement while laying block on the job site. The students will perform the skills used in blocklaying procedures; mixing mortar, use of the trowel, spreading mortar, making head/bed joints, laying masonry units. Demonstrate the different methods of spacing materials, the 6-8-10 method, use of the transit level, block spacing, on laying straight, plumb block to the line, and the use of a modular rule. This course will also include 10 hours of safety training required to receive the OSHA 10 card.

Content/Process		
1	Proportion and mix mortars manually with a hoe and mortar box.	
2	Stock a mortar board or pan.	
3	Temper mortar.	
4	Layout building lines using the pythagorean therum (6-8-10).	
5	Layout block corners and walls with tape measure.	
6	Square corners with a 2' framing square.	
7	Determining coursing using a modular rule.	
8	Plumb and level with mason's 2' and 4'levels.	
9	Chalk a line.	
10	Spread mortar for block.	
11	Butter head joints for block.	
12	Dry bond block.	
13	Lay block to a line while holding bond.	
14	Lay closure block.	
15	Finish block using a convex jointer.	
16	Practice a safe work envirnoment according to best practices in the masonry industry.	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

	Residential Maintenance Masonry **Class 460114** **Lab 460115**	

Course Description

This course covers the basic aspects of masonry as it relates to the residential structure. Emphasis is placed on proper handling, mixing, placing, and finishing of Portland cement products.

Content/Process

1	**Practice safe masonry procedures**	
2	**Use masonry trowels, hammers, and chisels**	
3	**Proportion and mix concrete**	
4	**Install concrete**	
5	**Edge, joint, and finish concrete**	
6	**Measure and mix mortar with a hoe and mortar box**	
7	**Repair/replace bricks**	
8	**Repair/replace concrete blocks**	
9	**Tuckpoint walls**	
10	**Cut masonry materials with hand tools**	
11	**Cut masonry materials with a circular saw**	
12	**Clean and maintain masonry tools**	
13	**Estimate masonry materials**	
14	**Store masonry tools, materials, and equipment**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

	Introduction to Building & Apartment Maintenance **460241**	
Course Description		
This course covers required safety practices in the shop and workplace; identification and use of hand tools used in the construction trades; identification of construction materials; interpretation of blueprints and/or drawings; and exposure to various mechanical and structural systems in a residential structure.		
Content/Process		
1	**Knowledge of safe shop practices and procedures**	
2	**Knowledge of fire safety equipment**	
3	**Knowledge of first aid procedures**	
4	**Carry and position ladders**	
5	**Identify and understand how to use measuring instruments and tools**	
6	**Understand how to safely use hand and power tools**	
7	**Identify and understand how to properly use a hammer**	
8	**Identify and understand how to properly use screwdrivers**	
9	**Identify and understand how to properly use a sledge hammer**	
10	**Identify and understand how to properly use ripping bar and nail pullers**	
11	**Identify and understand how to properly use a wrench**	
12	**Identify and understand how to properly use a pliers and wire cutters**	
13	**Identify and understand how to properly use a level**	
14	**Identify and understand how to properly use a square**	
15	**Identify and understand how to properly use a bench vise**	
16	**Identify and understand how to properly use a clamp**	
17	**Identify and understand how to properly use a saw (hand)**	
18	**Identify and understand how to properly use a file and rasp**	
19	**Identify and understand how to properly use a chisel and punch**	
20	**Identify and understand how to properly use a plumb bob**	
21	**Identify and understand how to properly use a socket and ratchet**	
22	**Identify and understand how to properly use a torque wrench**	
23	**Identify and understand how to properly use a wedge**	

24	**Identify and understand how to properly use a chalk line**	
25	**Identify and understand how to properly use utility knife**	
26	**Identify and understand how to properly use a chain fall and come-along**	
27	**Identify and understand how to properly use a wire brush**	
28	**Identify and understand how to properly use a shovel**	
29	**Identify and understand how to properly use a power drill**	
30	**Identify and understand how to properly use a saw (circular)**	
31	**Identify and understand how to properly use a grinder and sander**	
32	**Identify and understand how to properly use miscellaneous power tools**	
33	**Identify and understand how to maintain hand and power tools**	
34	**Identify and understand how to use stationary tools**	
35	**Identify and understand how to use fastening devices**	
36	**Identify and understand how to use anchoring devices**	
37	**Identify and understand basic framing components**	
38	**Identify and understand basic construction materials**	
39	**Identify and understand residential mechanical systems**	
40	**Identify blueprints and drawings**	
41	**Sketch a drawing**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

	Basic Bricklaying 4560110	
Course Description		
Demonstrate the proper and safe use of masonry tools and the various types of mortar and cement while laying block on the job site. The students will perform the skills used in bricklaying procedures; mixing mortar, use of the trowel, spreading mortar, making head/bed joints, laying masonry units. Demonstrate the different methods of spacing materials, the 6-8-10 method, use of the transit level, brick spacing, on laying straight, plumb brick to the line, and the use of a modular rule. This course will also include 10 hours of safety training required to receive the OSHA 10 card.		
Content/Process		
1	**Proportion and mix mortars manually with a hoe and mortar box.**	
2	**Stock a mortar board or pan.**	
3	**Temper mortar.**	
4	**Layout building lines using pythagorean therum (6-8-10).**	
5	**Square corners with a 2' framing square.**	
6	**Determine coutsing using a modular/brickspacing rule.**	
7	**Plumb and level with mason's 2' and 4' levels.**	
8	**Chalk a line.**	
9	**Carry brick with tongs.**	
10	**Spread mortar for brick.**	
11	**Butter head joints for brick.**	
12	**Dry bond brick.**	
13	**Lay brick to a line while holding bond.**	
14	**Lay closure brick.**	
15	**Finish joints with a variety of masonry tools.**	
16	**Demstrate a safe work enviroment according to best practices in the masonry industry and OSHA standards.**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

	Residential HVAC Maintenance **Class 460818** **Lab 460819**	
Course Description		
This course covers the basic aspects of maintaining various heating, ventilating, and air conditioning systems in residential buildings.		
Content/Process		
1	**Use safe HVAC procedures**	
2	**Explain the basic operation of furnaces**	
3	**Inspect a ventilation system**	
4	**Light and adjust a pilot light**	
5	**Adjust burners**	
6	**Inspect heat exchangers**	
7	**Adjust belts and pulleys**	
8	**Service fan motors**	
9	**Check air circulation around units**	
10	**Replace air filters**	
11	**Clean condensing and/or cooling coils**	
12	**Inspect flues**	
13	**Install thermostats**	
14	**Inspect and clean condensate lines**	
15	**Replace a thermocouple**	
16	**Install window air conditioning units**	

Connections:

***Common Core State Standards**

***KOSSA**

***Common Core Technical Standards**

***New Generation Science Standards**

CTSO's – Skills USA

	Basic Troubleshooting 470317	
Course Description		
This course explores the science of troubleshooting and the importance of proper maintenance procedures; how to work well with others, aids in communication, and trade responsibilities; examines actual troubleshooting techniques, aids in troubleshooting, and how to use schematics and symbols; focuses on specific maintenance tasks such as solving mechanical and electrical problems, breakdown maintenance, and the hows and whys of planned maintenance.		
Content/Process		
1	**Explain the reason efficient troubleshooting is important in a production plant**	
2	**List the steps in troubleshooting a machine/system**	
3	**Demonstrate good communication skills when dealing with plant personnel**	
4	**List the questions that should be asked when a machine/system fails**	
5	**List the signs of a machine in need of service**	
6	**List the information that should be recorded in a machine equipment record**	
7	**Identify calibration standards**	
8	**Identify different troubleshooting test equipment**	
9	**Use schematics when troubleshooting**	
10	**Identify differences in schematics when troubleshooting**	
11	**Use a troubleshooting chart**	
12	**Identify bearing wear problems**	
13	**Identify pump failure problems and solutions**	
14	**Identify types of hosing**	
15	**Identify current voltage charateristics of wire**	
16	**Apply all safety rules when working with electrical equipment**	
17	**Identify a pictorial diagram, a blocking diagram, and a schematic diagram**	
18	**Demonstrate how to troubleshoot an electrical problem**	
19	**List preventive maintenance procedures**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
CTSO's – Skills USA

	Digital Literacy **480101**	
Course Description		
The impact of computers on society, and ethical issues are presented. Students use a microcomputer and application software, including word processing, database, spreadsheets, presentation software, and the Internet, to prepare elementary documents, reports, and electronic presentations.		
Content/Process		
1	**Use a word processing program to create, save, print, modify, spell-check, and grammar-check a simple document**	
2	**Use a word processing program to enhance the appearance of a simple document by using centered, right-justified, boldfaced, underlined, and italicized text**	
3	**Use a word processing program to change the default margins and line spacing**	
4	**Use a word processing program to create a document with headers, footers, and footnotes**	
5	**Use an electronic spreadsheet to create, save, print, modify, and obtain graphs from a simple spreadsheet.**	
6	**Use an electronic spreadhseet to perform basic mathematical operations including, but not limited to addition, subtraction, multiplication, and division**	
7	**Use an electronic spreadsheet to calculate averages and percents**	
8	**Use an electronic spreadsheet program to enhance the appearance of a spreadsheet by changing fonts, foreground and background colors; and centering text across columns**	
9	**Use a database management program to create, maintain, and print reports from a simple relational database**	
10	**Use a database management program to customize the user interface by creating and maintaining forms and reports**	
11	**Use a database management program to query tables using basic query operations such as "and", "or", "not", etc.**	
12	**Print in landscape and portrait orientations**	
13	**Use the component of the operating system that helps the user manipulate files and folders to copy, move, rename, and delete files; and to create, copy, move, rename, and delete folders**	

14	**Use a World Wide Web browser to navigate hypertext documents and to download files**	
15	**Use Internet search engines and understand their advantages and disadvantages**	
16	**Use an electronic mail program to send and receive electronic mail**	
17	**Discriminate between ethical and unethical uses of computers and information including e-mail and internet etiquette**	
18	**Demonstrate a basic understanding of issues regarding software copyright, software licensing, and software copying**	
19	**Demonstrate an awareness of computer viruses and a basic understanding of ways to protect a computer from viruses**	
20	**Demonstrate a basic understanding of the impact of computers on society**	
21	**Use and understand basic computer terminology**	
22	**Identify types of computers, how they process information and how individual computers interact with other computing systems and devices**	
23	**Identify the function of computer hardware components**	
24	**Identify the factors that go into an individual or organizational decision on how to purchase computer equipment**	
25	**Identify how to maintain computer equipment and solve common problems relating to computer hardware**	
26	**Identify how software and hardware work together to perform computing tasks and how software is developed and upgraded**	
27	**Identify different types of software, general concepts relating to software categories, and the tasks to which each type of software is most suited or not suited**	
28	**Identify what an operating system is and how it works, and solve common problems related to operating systems**	
29	**Manipulate and control the Windows desktop, files, and disks**	
30	**Identify how to change system settings, install and remove software**	
31	**Be able to start and exit a Windows application and utilize sources of online help**	
32	**Identify common on-screen elements of Windows applications, change application settings and manage files within an application**	
33	**Describe and implement the protocol of utilizing presentation software.**	
34	**Use a presentation program to create, save, modify, spell check, and grammar-check a simple presentation.**	

35	**Deleted Task**	
36	**Use a presentation program to enhance the appearance of the slide designs, background colors, and layout.**	
37	**Utilize the print features in a presentation to include handouts, speaker's notes, and black and white.**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
***Post-Secondary: KCTCS ACR280**
CTSO's – Skills USA

	Residential Maintenance Wiring **Class 460333** **Lab 460335**	
Course Description		
This course covers the basic aspects of electric theory, wire and cables, fixtures and devices, and troubleshooting and maintenance wiring.		
Content/Process		
1	**Practice safe electrical procedures**	
2	**Use electrician's cutting, stripping, and connecting tools**	
3	**Demonstrate knowledge of electrical theory**	
4	**Use electrical test equipment**	
5	**Route, pull, and secure cables**	
6	**Remove cable sheathing**	
7	**Make electrical connections**	
8	**Remove/replace device boxes**	
9	**Remove/replace circuit breakers and fuses**	
10	**Identify and mark circuits in a service panel**	
11	**Check overloaded circuits**	
12	**Remove/replace lighting fixtures**	
13	**Remove/replace receptacles**	
14	**Remove/replace switches (SP, 3W)**	
15	**Troubleshoot/repair lighting and receptacle circuits**	
16	**Repair door bell/chime system**	
17	**Remove/replace photo electric control**	
18	**Remove/replace phone outlets**	
19	**Maintain electrical tools**	
20	**Estimate electrical materials**	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
***Post-Secondary: KCTCS ACR280**
CTSO's – Skills USA

	Introduction to Masonry **Class 460112** **Lab 460111**	
Course Description		
Introduce various types of mortar and cement along with the use of basic masonry tools. Emphasizes the different methods of spacing materials on a construction site, the 6-8-10 method, and use of the transit level, brick spacing, and modular rule. Focusing on laying straight and plumb brick to the line, bricking gables and building columns. Permits application techniques for setting up different types of masonry materials, marking off layout lines, and erecting batter boards along with techniques employed in different types of weather and climates. Laboratory.		
Content/Process		
1	**Proportion and mix mortars manually with a hoe and mortar box**	
2	**Set up and maintain a mortar mixer**	
3	**Proportion and mix mortar with electric and gasoline powered mixers**	
4	**Set up and maintain masonry saws**	
5	**Stock a mortar board or pan**	
6	**Temper mortar**	
7	**Lay out building lines using the 6-8-10 method**	
8	**Square corners with a framing square**	
9	**Determine coursing with a brick spacing rule and with a modular mason's rule**	
10	**Determine coursing with a modular mason's rule**	
11	**Drop jack lines**	
12	**Set corner poles for veneer**	
13	**Set freestanding corner poles**	
14	**Plumb and level with a mason's 2- and 4-foot levels**	
15	**Plumb with a plumb bob**	
16	**Chalk a line**	

17	Set lines, pins, blocks, and trigs	
18	Inspect, assemble, and disassemble rigging and scaffolding	
19	Carry brick with tongs	
20	Cut masonry materials with hand tools	
21	Cut materials with a masonry saw	
22	Identify brick types	
23	Spread mortar for brick	
24	Make head joints for brick	
25	Lay inside and outside brick corner leads	
26	Gauge masonry walls with a mason's modular rule	
27	Dry bond brick	
28	Bond a brick wall for range with a rule	
29	Lay brick to a line while holding bond	
30	Tuck-point a wall	
31	Finish joints with a variety of tools	
32	Identify types of block	
33	Lay out block corners and walls with a tape measure	
34	Bond corners for all widths of block	
35	Spread mortar for block	
36	Lay inside and outside block corner leads	
37	Lay a block wall to a line	
38	Lay closure block/brick	
39	Lay 4" partition block walls, and cap block	
40	Install foundation vents	

Connections:
***Common Core State Standards**
***KOSSA**
***Common Core Technical Standards**
***New Generation Science Standards**
***Post-Secondary: KCTCS MASE 105**
CTSO's – Skills USA

REFRIGERATION FUNDAMENTALS

Class 470219
Lab 470220

Course Description:

Introduces the fundamentals of refrigeration, refrigeration terms, and the basic refrigeration cycle. Proper use of tools, test equipment, and materials is stressed. Environmental issues including refrigerant handling are discussed. Refrigerant piping and methods used to join them are taught. General and specific safety is emphasized.

Content/Process

Students will:

1. **Practice/observe safety practices/techniques**
2. **Explain the history of refrigeration**
3. **Compare the benefits of closed vs. open system**
4. **Identify and explain the operation of the four major components**
5. **Identify the high and low sides of the system**
6. **Define matter and heat**
7. **Distinguish between the three states of matter**
8. **Explain the direction and rate of heat flow**
9. **Describe the three methods of heat transfer**
10. **Identify the reference points of temperature: boiling point, freezing point, critical temperature, absolute zero**
11. **Explain the difference between heat and temperature**
12. **Explain the differences between latent and sensible heat**
13. **Explain the relationship of pressures and fluids at different temperatures**
14. **Calculate absolute and gauge pressures**
15. **Measure absolute and gauge pressures**
16. **Explain how fluids react in a closed vs. open system**
17. **Compare temperature with pressure (P/T Chart)**
18. **Explain why fluids flow**
19. **Define the properties of refrigerants**
20. **Explain the uses of different refrigerants**
21. **Identify color coding of refrigerant cylinders**

22	Explain classifications of refrigerants
23	List proper transfer and storage of refrigerants
24	Explain the four parts of the refrigeration cycle
25	Draw a refrigeration system on a pressure-enthalpy (Ph) chart
26	Explain the benefits of superheat and sub cooling
27	Identify the effects of improper refrigerant in a system
28	Identify basic tools and accessories: various screwdrivers, nutdrivers, socket wrenches, Allen (hex) wrenches, open- and box-end wrenches, flare wrench
29	Identify power tools: general-purpose drill, power screwdriver, hammer drill, reciprocating saw, screw gun, etc.
30	Identify fasteners: bolts, screws, masonry anchors, various electrical connectors, conduit, pipe and cable clamps, nails, etc.
31	Identify pipe and tubing tools: pipe cutters, reamers and threaders, tubing cutters and reamers, benders, flaring tools, swaging tools, pipe vises, etc.
32	Describe lubrication methods utilizing: grease guns, oilers, sprays
33	Measure pressures with the refrigeration gauge manifold
34	Evacuate systems with a two-stage vacuum pump
35	Measure vacuums with a thermistor vacuum gauge
36	Measure temperatures with various thermometers
37	Charge a system with an electronic charging scale
38	Check for leaks with electronic leak detector dye and electrosonic
39	Identify types of pipe and tubing used in refrigeration work
40	Identify various types of fittings
41	Describe methods of insulating pipe and tubing
42	Identify soldering and brazing alloys used in HVACR
43	Explain applications of soldering and brazing alloys
44	Flare copper tubing
45	Swag copper tubing
46	Bend copper tubing
47	Identify types of torches
48	Solder and braze copper tubing
49	Cut and thread iron pipe
50	Describe heat sink methods

51	Describe heat exchange techniques
52	Explain saturation temperature
53	Determine the METD (Mean Effective Temperature Difference)
54	Check for and repair refrigerant leaks
55	Measure temperatures with bimetal and glass stem thermometers
56	Describe the applications of vibration eliminators
57	Identify types of evaporators: bare-tube, finned, plate, unit coolers, chillers
58	Explain the operation performance of a condenser
59	Charge system with refrigerant on liquid side as well as suction side
60	Test and adjust all operating and safety controls
61	Replace filter driers
62	Inspect electrical circuit for defective connections
63	Repair defective connections
64	Interpret wiring diagram
65	Clean drain line
66	Check all electrical components for voltage and current
67	Check and/or change compressor oil
68	Clean condenser coil surface (air cooled/water cooled)
69	Perform all aspects of preventive maintenance

INTERNSHIP EDUCATION

460183

Course Description:

Internship provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the internship do not receive compensation.

Content/Process

The Student Will:

1. **Gain career awareness and the opportunity to test career choice/s.**
2. **Receive work experience related to career interests prior to graduation.**
3. **Integrate classroom studies with work experience.**
4. **Receive exposure to facilities and equipment unavailable In a classroom setting.**
5. **Increase employability after graduation**

Connections

Kentucky Occupational Skills Standards Assessment

National Center for Construction Education research.

Common Core Standards.

21st Century Skills

COOPERATIVE EDUCATION 460180		
Course Description		
Cooperative Education provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work.		
Prerequisites: Consent of Instructor		
Content/Process		
1	**Gain career awareness and the opportunity to test career choice(s)**	
2	**Receive work experience related to career interests prior to graduation**	
3	**Integrate classroom studies with work experience**	
4	**Receive exposure to facilities and equipment unavailable in a classroom setting**	
5	**Increase employability potential after graduation**	
6	**Earn funds to help finance educational expenses**	
	Connections **Secretary's Commission on Achieving Necessary Skills (SCANS)** **National Center for Construction Education Research (NCCER)** **21st Century Skills** **Common Core State Standards ELA and Math** **Interdisciplinary Course**	